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to create a medical monopoly—a doctor's trust. They insist that the Owen bill is due to the American Medical Association. As a matter of fact the bill emanates from the senator from Oklahoma himself, and the movement for a national Department of Health has been organized, not by the American Medical Association, but by the Committee of One Hundred of the American Association for the Advancement of Science. This organization, as is well known, consists not of physicians, but of the united scientists of the country, and only a very small proportion of physicians are in the membership. The Committee of One Hundred contains the names of many of the representative thinking citizens of this country. They come from all over the country. It is absolutely absurd to talk about such men as organizing a medical trust. Practitioners of all the different cults in medicine are agreed that a national Department of Health would be a good thing, and can not possibly interfere with present state laws as to medical practise. This organization of opposition should of itself be a strong argument for the Owen bill. We have the Organization of Ill-Health for commercial reasons. Let us recognize and appreciate at their true value exactly the elements that are engaged in it.—*The Independent*.

#### SCIENTIFIC BOOKS

*L'Année Psychologique*. Troisième Année, 1907; Quatorzième Année, 1908. Publiée par ALFRED BINET. Paris, Masson et Cie.

These two volumes of M. Binet's *Année*, containing about 500 pages each, are as usual full of contributions of interest and value. Brief notice only can be given here of their rich contents.

The principal papers in the volume for 1907 are as follows:

1. H. Poincaré: The Relativity of Space (17 pp.).—We have no knowledge of an absolute space. Should space and all its contents be increased a millionfold in each dimension or undergo any other deformation according to any laws of any degree of complication whatever, we should know nothing of it pro-

vided the deformation applied consistently to everything, including the light rays and our own selves. The three-dimensional space of our perception is derived from the manner in which we perceive and systematize the movements of defence and adaptation that we make. Yet our three-dimensional manner of arranging these has been an efficient adaptation to the world and its properties; and so, though we can conceive of the existence of beings who, differently constituted, would systematize their space in a four-dimensional or other manner, we can not be certain that they could continue to live in our world and protect themselves against its manifold dangers.

2. Foucault: The Progress of Psychophysics (33 pp.).—A critical review of recent work, especially that of Müller, Lipps, Titchener and Aliotta.

3. P. Souriau: The Perception of Mental Facts (16 pp.).—In observing the facial and other expressions of another person, in hearing his words, our awareness is not of these as physical facts, but is of his feelings and ideas. We just as truly perceive these latter as we perceive physical phenomena, and in the same manner. The same thing is true within ourselves. One mental content is perceived always by another, as external to itself, in the same manner as in perceiving external facts. There is no difference in nature, or even in point of view, between introspection and external perception.

4. F. Plateau: Insects and the Color of Flowers (13 pp.).—Careful experiments prove that odor, not color, is the characteristic that attracts insects to flowers.

5. G. Zeligson: The So-called Psychical Secretion of Saliva (12 pp.).—Experiments conducted by M. Pawlow and his pupils add confirmation to the view that "all physiological phenomena may be completely studied as if psychical phenomena had no existence." Direct excitation of the mouth cavity of a dog produces an "unconditional" reflex secretion of the saliva. In case the exciting substance is something the dog eats, the secretion is thick; if it be one that the dog re-

fuses, the secretion is more liquid. Any other excitant, acting on any sense whatever (or any combination of excitants), may provoke a "conditional" reflex secretion of either kind, provided it has previously acted on the animal conjointly with another excitant which has produced an unconditional reflex. The conditional reflexes are very instable and variable. But the exact conditions of their origin, their force and their disappearance can be stated in physiological terms. The so-called psychological excitants are identical with these conditional reflexes.

6. Dr. Ley: *Medicine and Pedagogy* (8 pp.).—A statement of recent progress in various countries in the application of experimental methods to the solution of pedagogical problems. No details as to experimental methods are given.

7. J. Maxwell: *Psychology and Metaphysics* (14 pp.).—An account of experiments in apparent telepathy, with discussion of some of their laws of occurrence. Attempts no proof, but rather calls attention to the need of further investigation.

8. J.-J. Van Biervliet: *Touch and the Muscular Sense* (8 pp.).—Tactile sensibility increases in delicacy not only with natural, but also with acquired motility; as, for instance, that due to piano-playing. It is greater also during actual movement; on the forehead, for instance, if simultaneous contact gives a result of 7, and successive contact 4, movement of the head will reduce it to 2.

9. O. Decroly and J. Degand: *Experiments on Visual Verbal Memory and the Memory of Images in Normal and Abnormal Children* (11 pp.).—Concrete images are remembered more often and with less error than geometrical forms and single letters; and short phrases, provided they are interesting and concrete, are as easy, if not more easy, to retain in memory as are single words, and much easier than syllables or letters. It is more rational to begin the teaching of reading by the complete representation of an idea than by its elements.

10. B. Bourdon: *Cutaneous or Articular Sensibility?* (10 pp.).—Reviews the argu-

ments for and against the view that perception of the movement and position of the bodily members is due to articular sensations, and asserts that the following experiments prove it due to cutaneous sensations: (1) A stretching of the skin 0.2 mm. on the back of the fingers can be detected with almost entire sureness; and the most delicately detectable movements of the finger stretch the skin approximately the same amount; (2) anaesthesia of the skin prevents the perception of the most delicate movements.

11. H. Piéron: *History of the Belief in the N-rays* (27 pp.).—A thorough review of the subject, with a bibliography of 176 titles. "The N-rays (announced by Blondlot of Nancy in 1903) have no existence as an objective phenomenon. This marvelous experience in suggestion has given results of the greatest importance. The N-rays have shown us how, in a great mind, ill served by an excessively nervous temperament, an idea suggested by reflection or previous discoveries has been able, in a field where the subconscious has an immense influence, namely, that of the observation of feeble phosphorescent phenomena in the dark, to excite the perception of variations in brightness systematized by *a priori* conceptions; they have shown us how coincidences and chances that may be traced in detail developed in the same mind a belief in the existence of all sorts of expected properties, and how contagion spread to other minds in which, according to their own prepossessions, new orientations developed new systems under the influence of *a priori* ideas; how, when suggestion did not work, the notion of authority caused others to admit what they could not see; they have shown us also the limits and modalities of the action of suggestion, the limits of the principle of authority which was hardly effective beyond the national frontiers, as well as the factors which opposed these first influences, among which must be recognized national rivalry and personal jealousy; they have revealed the mental character of many French physicists, and shown the necessity among specialists of a psychological and logical education which

would doubtless have averted, in favorable surroundings, so long a propagation of an error so gigantic."

12. Georges Bohn: *The Acquisition of Habits in Animals* (17 pp.).—A review of experiments by different observers, showing that all animals, even to the lowest forms, are capable of forming associations between sensations and movements. "It is very possible that the mechanism for acquiring habits does not differ greatly in the inferior animals from that of higher animals."

13. Crépieux-Jamin: *Expert Examination of Handwriting, and the Lessons of the Dreyfus Affair* (43 pp.).—Careful examination of the handwriting of the famous "bordereau," and comparison with the writing of Dreyfus and of Esterhazy, prove conclusively, as is here shown in detail, that Esterhazy was its author. The history of the case is instructive as to the present situation concerning expert testimony in regard to handwriting. There are real experts, reliable though not infallible, and the subject requires much further study and research. But there are also unfortunately many who merely pose as experts, without real knowledge or conscience. It would be desirable to have an official commission appointed to study the subject (as was done, with important chemical conclusions, in 1826), and especially to decide upon practical tests to which would-be experts might be subjected.

14. Étienne Maigre: *The Nature and Origin of Instincts according to Weismann* (15 pp.).—An exposition of Weismann's proofs that instincts are complex combinations of reflexes.

15. A. Imbert: *The Experimental Scientific Study of Professional Work* (15 pp.).—In spite of the fact that no reliable estimate in kilogrammeters of the energy expended in the work of laborers is possible, yet definite experimental studies can and should be made as an aid to the establishment of just laws and regulations regarding workmen.

16. R. Masselon: *Intellectual Weakness in Dementia Precox, Senile Dementia, and General Paralysis* (15 pp.).—Dementia precox is

characterized by disappearance of affective phenomena as a primary feature, leading to indifference, apathy, aboulia; by loss of intelligence and by incoherence; but memories are very persistent, disappearing only in the most severe cases.—In senile dementia, memory disturbances are primary; the patient is coherent, and is depressively emotional.—General paralysis shows decrease in memory with increasing incoherence, and relative preservation of the emotional life, involving sudden variations from depression to expansion, with the latter predominant.

17. E. Régis et G. Laurès: *Clinical and Psychological Study of Chronic Mental Confusion* (17 pp.).—This condition, the characteristic psychosis of organic states of intoxication, is implicitly recognized but has never been described. In it, along with improvement in bodily health, persist the fundamental psychical symptoms of torpor, stupidity, loss of orientation, amnesia. Experimental studies show that the symptoms are due to complete apathy, intellectual, emotional and voluntary, corresponding to the condition of sleep or torpor of the cerebral cells due to the toxic poisons of the acute stage. There are two forms, the simple and the delirious. Dementia may be but a final stage of the series that begins with acute mental confusion and continues in chronic confusion.

18. J. Deniker: *The Question of Races in Psychology* (16 pp.).—A summary of the author's opinions, as expressed in his book: "Les races et les peuples de la terre," 1900; since which time nothing has been published tending to modify his classification. He recognizes 29 races, divisible into 6 groups on the basis of the character of the hair, or into 17 groups, according to geographical distribution; and he gives briefly the characteristics of these groups.

19. L. Fredericq: *The Physico-chemical Conditions of the Action of the Nervous Centers* (16 pp.).—Reviews recent progress of knowledge with a bibliography of 48 titles. Considers organic combustion, circulation, materials and products of combustion, elec-

tricity and heat, influence of activity on the development of the neurones.

20. Ch. Chabot: *Advocates the Cooperation of the School and the Family* (18 pp.).

21. F. Bernheim: *Evolution of the Problem of Aphasias* (26 pp.).—This problem is still in a process of development. The general acceptance of the classical theory has disappeared, and there are now three principal divergent theories in the field: Déjerine defends the classical localization of the affected centers; Marie locates them very differently; Bernheim of Nancy denies the existence of verbal centers and holds that the lesions affect pathways of connection. To settle the question we need more clinical and pathological anatomical facts, and more reliable psychological analysis.

22. E. Wertheimer: *Pain and Pain Nerves* (30 pp.).—The sensation of pain is apparently confined to organisms with a highly developed nervous system. Its rôle is purely defensive. In lower organisms there doubtless exists an effective mechanism of defense against destructive external agents involving only appropriate reflexes without pain or consciousness. Abundant evidence shows that the sensation of pain is not due to the action of the nerves of the other special senses; for example, the painful impression produced by an intense light arises, not from any excitation of the fibers sensitive to light, but from excitation of the ciliary nerves due to energetic contraction of the iris. The paper gives at length the evidence for the separateness of the pain-nerves, discusses methods, and reviews the literature dealing with the characteristics of the pain-sensations.

23. A. Van Gehuchten: *The Peripheral Nervous Pathways* (20 pp.).—Gives the latest results of research regarding the nature of these structures, both centripetal and centrifugal.

24. G. Bonnier: *The Double Individuality of Plants* (39 pp.).—With the exception of the majority of the mushrooms and some algæ, all plants, including all the higher types, exhibit the double individuality of alternating sexual and asexual generations.

25. G. Cantecour: *Sociological Ethics* (18 pp.).—A review of modern theories.

26. J. Languier des Bancelles: *The Experimental Study of Intelligence and Will* (15 pp.).—Contains brief reference to researches by Binet and by Ach, and extended presentation of experiments by Watt on association-reactions of the predetermined type. Dwells less on time results than on introspective data, concerning mainly the stages and mechanism of the process, the existence and kinds of intercalary images between stimulus and response, the existence and nature of the generic image, the fact that the directive thought remains subconscious, etc.

In the fourteenth volume of the *Année*, that for 1908, M. Binet announces that henceforward it will cover a more definite and limited field than before. It will devote particular attention to practical and social problems. Already in previous numbers there have been considered such subjects in this field as the legal value of testimony, questions in pedagogy, methods of measuring the intelligence of normal children, the classification and instruction of defective children, and the like. These and similar researches will be continued, with the endeavor to render real service to law and to pedagogy, to industrial organization, to pathology, to medico-legal practise, to the individual's choice of occupation and profession. These are truly practical psychological questions, in the full sense of the word.

This number includes the following papers:

1. Binet and Simon: *The Development of Intelligence in Children* (94 pp.).—The authors have worked out a series of simple tests, applicable to children between the ages of three and thirteen years, for accurately placing them in a "metric scale" of intellectual development. The methods are described in full detail, so that they may be easily applied by others. They believe it to be practical, convenient and rapid. They have used it already sufficiently to assure them of the essential accuracy of its results. It determines whether a child has reached the average normal development in intelligence for his

age or by how many years he differs from it, in advance or behind. It is applicable also to many adults, who are either idiotic, imbecile, or weak-minded, and can make definite distinctions between these three conditions. The paper must be read as a whole by any one interested, for no brief review can give the essential details of the method, the careful analyses of the factors of intelligence, judgment, knowledge and attentiveness involved in the results obtained, and the numerous situations in which it is clearly shown to be of value. Further instances of its application appear later in this volume.

2. L. Houlléviq: Ideas of Physicists in Regard to Matter (15 pp.).—Describes modern views as to the nature of molecules, ether, atoms, electrons and ions; shows that the trinity of matter, ether and electricity is probably reducible to the two last named; and expresses a hope that the universe may possibly some day be explained in terms of ether alone.

3. P. Souriau: The Teaching of Esthetics (15 pp.).—Advocates its introduction into secondary schools, and outlines a course, partly experimental and partly rational.

4. É. Borel: The Calculation of Probability and the Method of Majorities (27 pp.).—A discussion of the value of majorities in establishing the probability of the correctness of the opinions held by them. Among the results of the discussion, these are perhaps the most interesting: The collective sensibility of all observers may greatly exceed the individual sensibility of any one of them, as is shown in an example of estimating weight-differences, where the collective sensibility was twice as fine as the individual. In qualitative experiments, a majority exceeding that which might be due to chance establishes the existence of "something objective" determining its direction; direct observation of the facts must then lead to hypotheses concerning the nature of this "something objective," and these must then be verified by further experiments. The method of majorities is a useful step in arriving at truth.

5. A. Binet: An Inquiry concerning the Evolution of Instruction in Philosophy (80

pp.).—A questionnaire addressed to the 300 teachers of philosophy in France, and answered by 35 per cent. of them, justifies among others the following conclusions: Apart from materialism and pantheism, all types of philosophical thought are still represented. But the teaching of philosophy is undergoing an evolution. There is no longer an official state philosophy. The liberty of the professor is increasing. Dogmatism, formal logic and metaphysics are discredited, partly because the importance of pure reflection has diminished by comparison with the splendid conquests won by experimental methods, partly because of the modern demand for immediate utility. Scientific and practical interests prevail, especially of a sociological nature. Scepticism and pessimism are disappearing because the conception of philosophical teaching has become one of practical activity.

6. A. Imbert advocates the establishment of permanent laboratories for the study of fatigue, nourishment and other questions involved in preventing overwork among professional laborers (17 pp.).—There is need of research to determine the daily task which can be accomplished by workmen of average strength and resistance without detriment to their health.

7. F. Rauh: Ethics and Biology (15 pp.).—For the partisans of a biological ethics, ethical facts are reducible to biological facts. It is true that knowledge of biological laws modifies profoundly our ethical conceptions. But the relation is one of impulsion, of inspiration, not of identity.

8. E. Goblot: Mathematical Demonstration: Criticism of the Theory of M. Poincaré (20 pp.).—In mathematical demonstration, the consequence results from the principles, but is not contained in them as is true in a syllogism. Poincaré solves the difficulty by regarding reasoning by recurrence, or mathematical induction, as the true mathematical method and a form of synthetical judgment *a priori*. Goblot disputes this view, holding that it is the constructive activity of the mind, exfoliating the given facts, that discovers the new results; not inductive, not

synthetic *a priori*, but constructive. This is true of all mathematical demonstrations, including the method of reasoning by recurrence, which is only one form and a relatively rare one. He further distinguishes between the mathematics of functions of three or more variables and the geometry of space. Intuitive geometry is not a mathematical, but a natural science. Finally he holds that M. Poincaré has often wrongly been classed as a pragmatist.

9. A. Binet and Th. Simon: *Language and Thought* (56 pp.).—By means of their "metric scale of intelligence," described above, the authors are able to determine the degree of intelligence of a mentally deficient person, as equivalent to that of a normal child of such or such an age. The study of imbeciles, idiots, etc., makes it possible to determine exactly what intellectual acquisitions would be possible for a normal child of any particular age, giving results which can not be obtained from the study of the child himself, because his continuing development carries him beyond the level that one desires to study before he has exhausted all its possibilities. Applying this new psychogenic method, the authors believe that they have established by means of precise observations the fact that "there exists thought without images, and without words, and that thought itself consists of an intellectual feeling (*un sentiment intellectuel*)." This vague feeling becomes precise and detailed, when it produces images, words and acts; but these latter come after the thought.

10. C. Chabot: *Hygiene and Pedagogy* (15 pp.).—Modern civilization presents this antinomy: there are more and more things which must be learned in order to keep up with the times or gain a livelihood; but the accomplishment of this necessary labor is vain if it ruins the health of the present generation and the future of the race. Scholastic hygiene has a large rôle to play. But it must be within limits. It would be a mistake, for instance, to condemn work in the schools according to the fatigue that it produces. Hygienic regulations must not inter-

fere with the right of the teacher to regulate the work of the scholars who are well, and to determine in what manner a mind or a character is to be formed.

11. G. Cantecor: *Pragmatism* (25 pp.).—After examining at length its origin, its content and its value, the author finds in pragmatism neither definite problem, nor methodical discussion, nor exact solutions, but only vague affirmations, equivocal statements, hasty improvisations.

12. E. Maigre: *A Study of Reflection* (10 pp.).—Experiments of Watt, Ach and Messer show that a predetermined relationship influences an association usually in a subconscious manner. Binet arrives at a similar conclusion. Lindley, however, and others hold that a problem is solved by repeated conscious trials, setting out from the given data. These divergent results may be due to the extreme simplicity of the problems given by the first mentioned experimenters. It is clear that the effort of thought becomes more and more voluntary and conscious, in proportion as a problem is complicated, as is illustrated by researches of Bühler and Gard. The author's own observations confirm and complete these results. He believes that it is a feeling (*sentiment*) on the part of the subject that arrests the associative mechanism when it has led to an association which does not conform to the problem, and that leads to new associations, rather than to a repetition of the old, when one starts again from the first idea. The return itself to the first idea may be a voluntary or an automatic act. Souriau's theory that "by reflection we find more easily ideas apart from the subject that occupies us than on the subject itself," may be occasionally true, but it is no more worthy of being generally followed than would be a theory that it is necessary to solve all problems in sleep because some solutions are found in that way.

13. A. Binet: *A Test of Experimental Cheiromancy* (15 pp.).—For many years M. Binet has been studying the various external physical signs, such as form of the head, physiognomy, handwriting, that give some indications in regard to intelligence and

character. Having opportunity to make use of the services of a professional cheiromantist, he submitted to her the hands alone (the persons being concealed and no words spoken) of 30 pupils of both sexes, half of them of exceptionally high and half of abnormally low intelligence, demanding only whether she found them intelligent or not. Her diagnosis was correct in 63 per cent. of the cases. Again, he had photographs made of the hands (front and back views) of 20 pupils of both sexes, and submitted them for judgment to 20 persons. The percentage of correct determination of sex was 70, of intelligence 54. But applying the method of majorities (see Borel's paper above), 76.5 per cent. of the judgments were correct; the majority being superior in correctness of judgment not only to the average, but to any one of the individuals composing the average. These results surpass those obtainable by chance; and there is therefore some indication of intelligence furnished by the form of the hand, deserving of more detailed study.

14. A. Binet: *A Pedagogical Causerie* (27 pp.).—Expresses the author's belief that psychology has more value for pedagogy than was attributed to it in a recent book by James; defends the value of examining the vision of pupils; describes the classes of abnormal pupils recently established in the schools, and the manner of admitting pupils to them only in case a definite but brief examination of their scholastic attainments has shown them to be at least three years behindhand, and another examination according to the "metric scale" (described above) has shown their intelligence to be defective by at least two years; exhibits the value both to normal and abnormal pupils of their association in the same school but in different classes; discusses the question of accurate control of actual progress made, a necessary condition of scientific pedagogy, and asserts that according to one method of control a class of abnormal pupils gained two and a quarter years in one year of the new instruction; develops a plan of mental orthopedic treatment; and gives the results of anthropo-

metric measurements that have been made in comparing normal and abnormal pupils.

15. The volume concludes with a number of bibliographical analyses.

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*The Conquest of Disease through Animal Experimentation.* By J. P. WARBASSE, M.D. Pp. xii + 176. New York, D. Appleton & Co. 1910.

Dr. Warbasse has written a very timely book. The public hears much from the opponents of animal experimentation. Books, special periodicals and public lectures denounce the practise of vivisection and the inoculation of animals with disease germs; even exhibits are gotten up, representing animals undergoing tortures, showing the instruments used to operate on animals without, it is claimed, the use of anæsthetics, making a veritable chamber of horrors for the purpose of prejudicing the public against methods of scientific inquiry which have produced so much of value in controlling human disease. The anti-vivisectionists are busy; they are often influential, and too frequently they are unrestrained by a sufficiently scrupulous regard for truth from misrepresenting, often grossly, the cruelties practised in and the value resulting from experiments on living animals. Repeated attempts are made to get laws passed through state legislatures and the national congress preventing or greatly restricting such experimentation. It can not be doubted that the ardent propaganda of the opponents of vivisection influences public opinion to a very considerable extent. It is easier to appeal to the naïve sympathies of people by recounting tales of cruelty to poor dumb animals than it is to give them an adequate conception of the bearing and probable utility of the scientific experiments on living animals which are being carried on for the conquest of disease. Dr. Warbasse gives, in popular form, a good survey of this general field of investigation. There are chapters on the technique of animal experimentation, the extent to which pain is probably inflicted on animals, the discoveries in physiology due to animal experimentation,